Executive Summary

Draft Environmental Impact Statements for Proposed Water Contracting Programs in the Sacramento River, American River, and Delta Export Service Areas

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
December 1988

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Opportunities for Public Involvement

Public input is important to the environmental impact statement (EIS) process, as it helps shape the scope and content of the EISs. Scoping meetings were the first opportunity for public input. In addition, three public information meetings were held during the preparation of the EISs to assist the public in understanding the Bureau of Reclamation's water contracting program.

Following release of the Draft EISs, major opportunities for public input will be to attend public hearings and submit written comments on these documents. All oral and written comments received will be considered and responded to in the Final EISs.

Federal, state, and local agencies have received the Draft and Final EISs, as have selected individuals and groups. EISs are also available for review at selected libraries throughout the region. A workshop will be held in Sacramento at 7 p.m. on January 17, 1989, in the Terrace Room of the Clarion Hotel, 700 16th Street, to answer questions regarding conclusions in the EIS and the methods used to reach them.

Formal public hearings to accept testimony and comments on the adequacy of the Draft EISs will be conducted during January and February 1989, at the following locations:

Tuesday, January 31	Blue Gum Restaurant Highway 99W Willows, CA 95988
Thursday, February 2	Holiday Inn Holidome Sierra Room 5321 Date Avenue Sacramento, CA 95841
Monday, February 6	Center Plaza Holiday Inn Conference Center 2233 Ventura Fresno, CA 93721
Wednesday, February 8	Concord Hilton Baldwin and Chabot Rooms 1970 Diamond Blvd. Concord, CA 94520

All hearings will begin at 7 p.m. A time limit on oral testimony from any individual or organization may be set to assure that all those present have an opportunity to present their comments. Persons who wish their testimony to become a part of the permanent record of the proceedings should be prepared to present an oral summary of any written testimony. The comment period will close on March 3, 1989.

Contact Persons

For more information or to obtain a copy of an EIS, contact:

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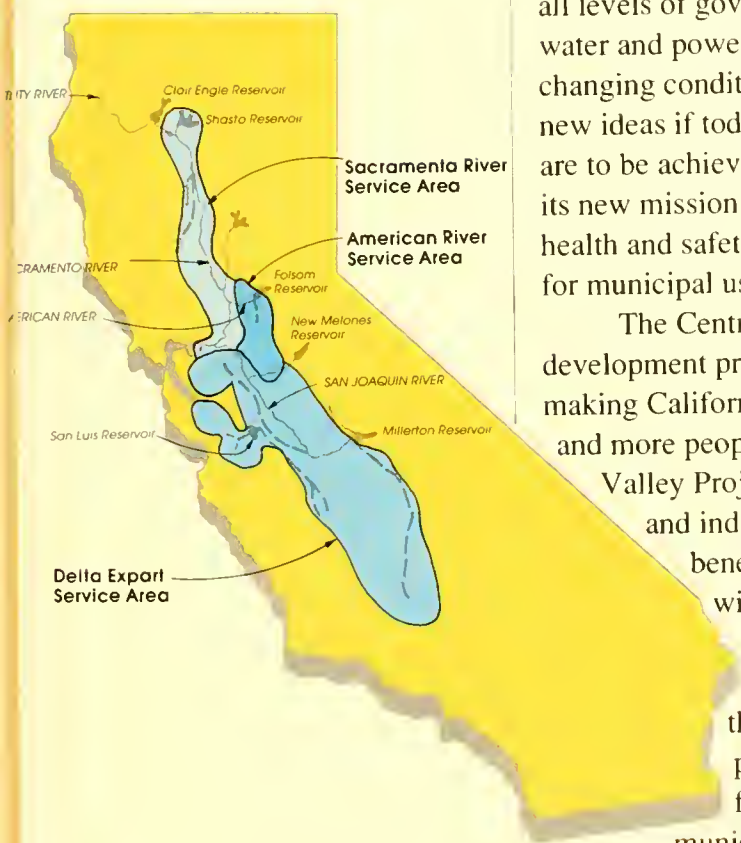

In recent years, the Bureau of Reclamation's primary role as the developer of large, federally financed agricultural projects has changed. No major new reclamation projects have been authorized by Congress since 1968. Environmental concerns, a farm economy burdened with increasingly costly projects, a revised public perception of Reclamation's mission, and budgetary constraints at all levels of government have combined to make major agricultural water and power projects increasingly difficult to justify. These changing conditions and shifting social values must be met with new ideas if today's goals of a stable and secure living environment are to be achieved. Reclamation is rising to these challenges with its new mission, contributing to an environment that protects public health and safety and provides a clean and reliable source of water for municipal use, industry, fish and wildlife, and agriculture.

The Central Valley Project, Reclamation's multipurpose water development project in California, has played an important part in making California the nation's premier agricultural region. As more and more people crowd California's cities and towns, the Central Valley Project is meeting the growing demand for municipal and industrial water. Additional, increasingly important benefits are recreational opportunities and fish and wildlife protection.

We are pleased to present for your consideration Reclamation's plan for accomplishing these goals in the Mid-Pacific Region. The proposed plan would allocate approximately 1.5 million acre-feet of water per year to meet the needs of municipalities, industries, wildlife refuges, and agriculture in the Sacramento River, American River, and Delta Export Service Areas. It is our judgement that this plan is consistent with our new mission and will allow Reclamation to better meet California's water needs. We encourage each of you to review the proposed plan and provide us with your comments and suggestions.

Lawrence F. Hancock

Lawrence F. Hancock
Acting Regional Director
Mid-Pacific Region
Bureau of Reclamation

Introduction

Federal water projects administered by the Bureau of Reclamation have played an important role in California's development. The Central Valley Project (CVP), linking the basins of the Sacramento, American, and San Joaquin Rivers through the Sacramento-San Joaquin Delta, has provided water for central California's agriculture, municipalities, industry, and wildlife refuges since the 1940s. Water purveyors in this region contract with Reclamation for water to serve industrial and domestic customers and to irrigate 2.8 million acres of prime agricultural land. The CVP service areas appear on the map on the previous page and their major features are shown on the map on page 3.

Since 1979, the U.S. Department of the Interior has imposed a moratorium on new, long-term contracts for uncommitted water from the CVP because of concerns about environmental and water quality effects in the Delta. Contracting for additional long-term CVP water supplies was deferred until federal responsibility for Delta water quality could be determined.

Resolution occurred in 1986, when the Coordinated Operation Agreement (COA), forged between the state and federal governments, was enacted as Public Law 99-546. The COA required the CVP, in conjunction with the State of California Water Project (SWP), to operate in conformity with state water quality standards for the Delta unless such operation was not consistent with congressional directives. As a result of this and other Reclamation actions on Trinity and Sacramento River fisheries and water quality, the U.S. Department of the Interior has lifted the moratorium on water contracting. Therefore, Reclamation is now able to resume long-term contracting of available and uncommitted water from the CVP.

Before Reclamation can enter into such contracts, however, it is required by the National Environmental Policy Act (NEPA) to prepare environmental impact statements (EISs). EISs describe proposed actions and assess their impacts on the environment in such areas as fisheries and wildlife, energy, land use, population, housing, and related social effects. The law requires an EIS in this case because entering into new, long-term contracts is a

major federal action that may have significant effects on the environment.

Because three distinct geographical areas would be served by the new water contracts — the Sacramento River Service Area

(SRSA), the American River Service Area (ARSA), and the Delta Export Service Area (DESA) — Reclamation has prepared one EIS for each area. Each EIS evaluates the regional and cumulative impacts of alternative ways of allocating available CVP water to existing or new customers.

To prepare the EISs, Reclamation held numerous public meetings, solicited written input from public and private agencies, interest groups, and individuals, and distributed information that responded to public concerns. In greatly abbreviated form, this booklet summarizes the important points of the EISs. ■

NEPA Compliance

Reclamation is using a two-tiered approach to providing the environmental documents NEPA requires for the new or expanded CVP contracts. The water contracting EISs summarized in this publication will serve as the first tier. They assess broad, generic, regional, and cumulative impacts associated with water contracting.

As a second tier, site-specific NEPA environmental documents will be prepared. The scope of the documents will be limited to potentially significant impacts of water contracting within the purview of each water agency. Many of the potential site-specific impacts are identified in the EISs. Before contracts are signed between Reclamation and each agency, these more tightly focused documents will be completed. This second-tier action will provide compliance with NEPA requirements and will also meet requirements of other laws such as the Endangered Species Act and the National Historic Preservation Act.

History of the CVP

California is a land of fertile soil, but uneven water distribution. Precipitation ranges from 174 inches per year in the northwest to little more than a trace in the southeastern deserts, and it nearly all occurs from November to March. Before today's water control facilities were built, great volumes of water surging out of the mountains during winter storms flooded the Sacramento, American, and San Joaquin river basins and caused extensive damage to agricultural fields and communities.

With growth of the population and acreage under tillage, state and federal governments assumed responsibility for water control in California. In 1850, the state's first legislature had created the office of the Surveyor General to study problems of navigation, drainage, and irrigation. The Reclamation Act of 1902 established the Bureau of Reclamation (originally known as the Reclamation Service) to help "reclaim" arid western lands by providing irrigation water. By storing floodwaters and building canals, Reclamation aimed at fostering western settlement and improving the economic position of farmers.

The Central Valley Project was initiated in 1933 by the State of California when it passed legislation authorizing Shasta Dam, a power plant on the Sacramento River, a transmission line and other works between the Shasta Dam site and Antioch, and the Contra Costa, Madera, and Friant-Kern Canals. Because of the Great Depression, however, the state found it could not finance the projects and appealed to the federal government for help. Congress authorized construction of the CVP in 1935 and appropriated funds for it in 1937. With Reclamation in charge, construction of the Contra Costa Canal began October 19, 1937.

Many additional features of the CVP have since been completed. Impetus for the great dams came from farmers and townspeople who returned the costs of construction many times over—not only in dollars, but in the food, fiber, jobs, energy, and investments that they have contributed to America's prosperity. As the West has grown and water resource needs have increased, Reclamation's mission has expanded as well. In addition to irrigation, its responsibilities now extend to hydroelectric power generation, municipal and industrial water supplies, river regulation and flood control, outdoor recreation, improvement and protection of fish and wildlife habitats, and water quality control. ■

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CVP Facilities

The **Sacramento River Service Area** includes the Shasta/Clair Engle Reservoir area and much of the Sacramento Valley. Water contracting within this service area would affect portions or all of the counties of Shasta, Tehama, Glenn, Colusa, Yolo, and Solano.

The **American River Service Area** includes Folsom Reservoir and all of Sacramento and San Joaquin Counties. In addition to those counties, water contracting in the ARSA also would affect a portion of Placer County.

The **Delta Export Service Area** includes all of the CVP area located south and west of the Delta. It begins just south of the Delta, extends through the San Joaquin Valley to near Bakersfield, and includes the San Felipe Unit. Water contracting within this service area would affect Fresno, Kern, Kings, Madera, Merced, San Joaquin, Tulare, Monterey, San Benito, Santa Clara, and Santa Cruz Counties.

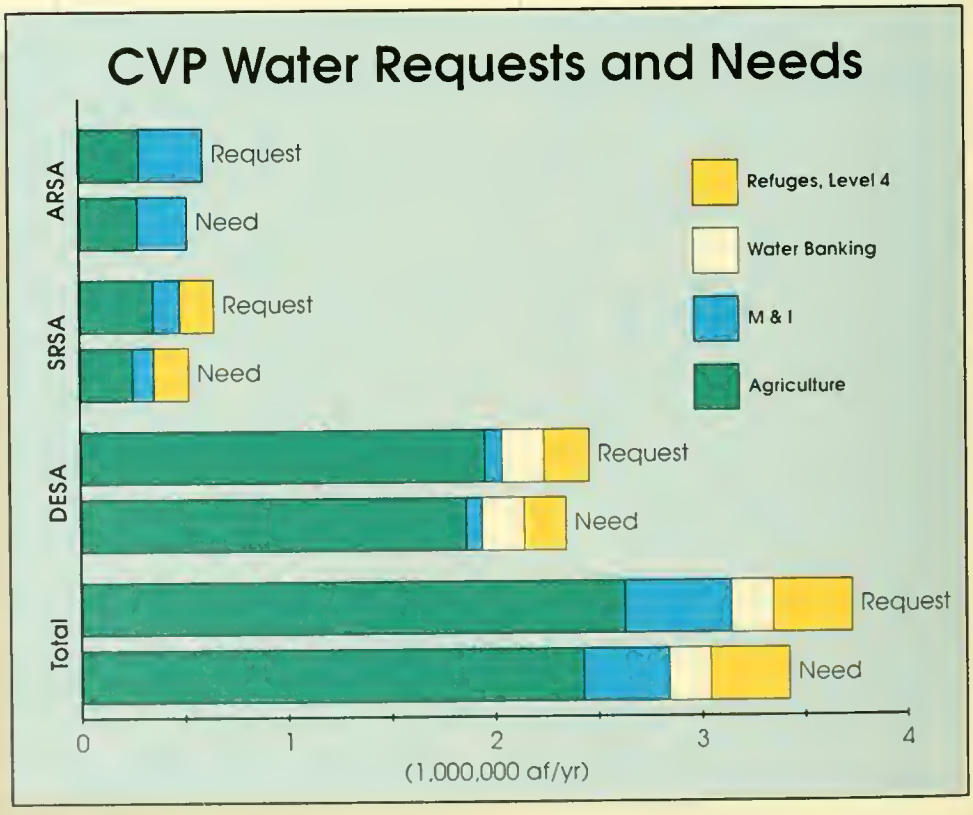
Program Development

Reclamation's water contracting program is intended, in part, to meet the following objectives:

- Equitably allocate remaining CVP yield, considering original congressional legislation, other authorized project functions, and California water rights law and area-of-origin policies.
- Optimize the amount of water available for beneficial uses such as agriculture, municipalities and industry, and wildlife refuges. At the same time, stretch the supply with innovative concepts such as conjunctive use of surface and groundwater and use of wildlife refuges for offstream storage.
- Optimize the economic returns at the local, regional, and national levels.
- Increase the amount of water available for beneficial use in the Central Valley.

But these objectives do not completely describe the program. Its dominant goal is to provide a balanced water allocation that, on the whole, best meets the needs of the users, the environment, and Reclamation's overall program.

The first step toward providing a balanced allocation of water was to determine the needs of potential contractors. In 1986 and 1987, Reclamation asked potential contractors in the three service areas to identify and substantiate



how much CVP water they would need. Eighty-four agencies replied, requesting approximately 4 million acre-feet per year (af/yr). Reclamation evaluated each request considering the requestor's acreage, cropping pattern, groundwater availability, population estimate, and other factors. The analysis assumed that users would practice economically feasible conservation, fully use the safe yield of groundwater, and not expand irrigation in areas where the groundwater aquifer is overdrafted.

Based on Reclamation's analysis, CVP water users' needs for agriculture, municipal and industry (M&I), and wildlife refuges were determined to be between 3.3 and 3.4 million af/yr, although firm water available for contracting is far less than this amount. Two water supply levels were proposed for wildlife refuges. The amount labeled "Level 2" in the EIS represents no change from the present average annual supply, while "Level 4" represents the annual supply that would allow optimal management of existing Central Valley refuge lands. Requests for water banking, maintaining instream flows, and satisfying recreational requirements were also received and evaluated. ■

Other Activities Related to CVP Water Contracting

Reclamation Petition to SWRCB for Consolidated and Expanded Place of Use (to permit use of any project water for any project purpose)

SWRCB Bay-Delta Hearings (may set new water quality standards for the Bay-Delta estuary)

Central Valley Fish and Wildlife Management Study

Central Valley Task Force (responds to fish and wildlife concerns)

Reclamation's Refuge Water Supply Study

Reclamation's Offstream Storage Studies

Delta Support Study (an interagency ecological study program)

DFG and DWR Instream Flow Incremental Methodology Study

Trinity River Basin Comprehensive Action Program

Red Bluff Diversion Dam Winter Operations

Shasta Water Temperature Control Study

Iron Mountain Mine (Superfund site)

Shasta Unit Waste Discharge Requirements

American River Flood Control Activities

Environmental Defense Fund et al. v. East Bay Municipal Utility District

Auburn Dam

Natural Resources Defense Council v. Stamm

Pleasant Valley Water Project

Reclamation/DWR Wheeling-Purchase Agreement (subarticle 10h of the COA)

San Joaquin Valley Drainage Program

Petitions for Changes in Points of Diversion

San Joaquin Valley Conveyance Study

Stanislaus-Calaveras River Basin Water Use Program

South Delta Water Management Program

North Delta Water Management Program

Contra Costa Water District v. Hodel

Westlands Water District Intertie Project

Los Vaqueros Project (Contra Costa Water District)

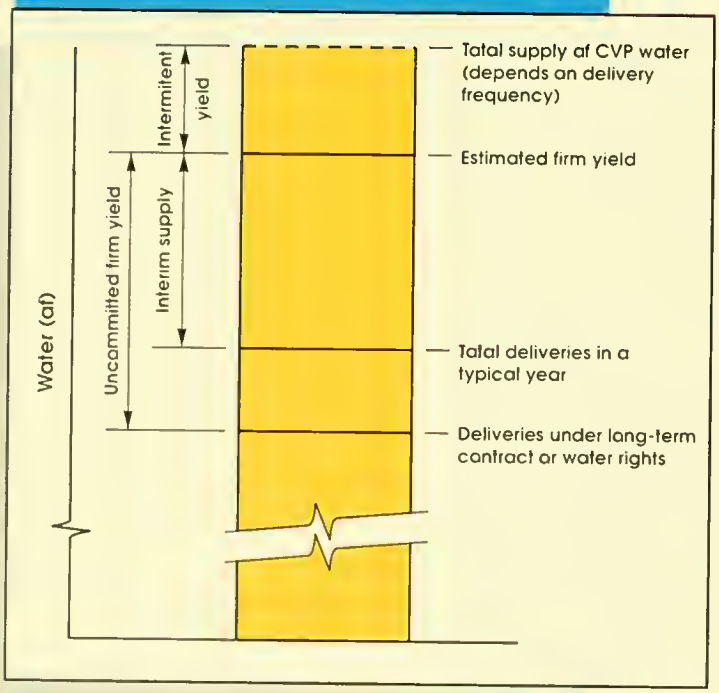
Kellogg Unit Reformulation Study

Delta Islands Water Storage

Westlands Water District v. United States of America, et al.

Water Allocation Alternatives

Firm yield is a quantity of surface water that can be made available by CVP operations. It is calculated by using data from the 1928 through 1934 dry period. The calculation assumes a certain deficiency in delivery totaling 100 percent of one year's supply over the 7-year period, with no more than a 25 percent deficiency occurring in any one year. This calculation results in delivery of approximately 90 percent of actual contract amounts for the 57-year hydrologic period used in analyses for the EISs.


Water (af)
Intermittent yield
Uncommitted firm yield
Interim supply
Total supply of CVP water (depends on delivery frequency)
Estimated firm yield
Total deliveries in a typical year
Deliveries under long-term contract or water rights

Intermittent yield is surface water in addition to the firm yield that can be made available in other than critically dry years. The amount available depends on the delivery frequency, quantity of runoff, and carryover water in storage from prior years. Reclamation proposes an intermittent supply that results in delivery of approximately 60 percent of actual contract amounts for the 57-year hydrologic period used in analyses for the EISs.

Interim water is that portion of the CVP firm yield that is not delivered to contractors in any given year. Reclamation enters into interim water contracts if supplies are available.

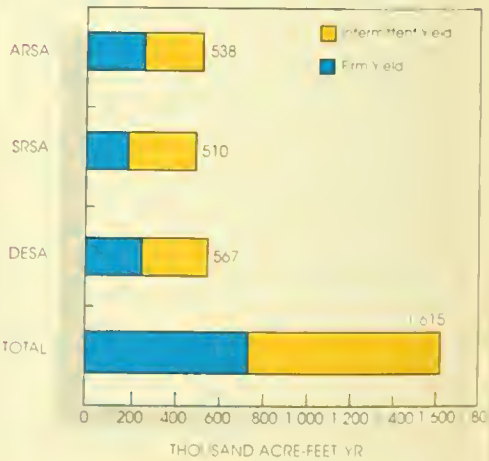
No-Action Alternative

This alternative was developed to meet NEPA requirements and to serve as a baseline for assessing the impacts of other alternatives. The No-Action Alternative describes projected future (2020) conditions in the absence of new water contracting.

Alternative 1: Dependable Supply Contracting

Reclamation's policy has been to fully meet water contracts with firm yield water. Dependable supply contracting would increase the CVP's ability to meet service area needs by allowing it to provide the contracted level with a combination of firm and intermittent supply. In drier years, the supply would be made up of uncontracted CVP supply and groundwater or local surface water supplies in varying proportions.

Alternative 1A Allocations

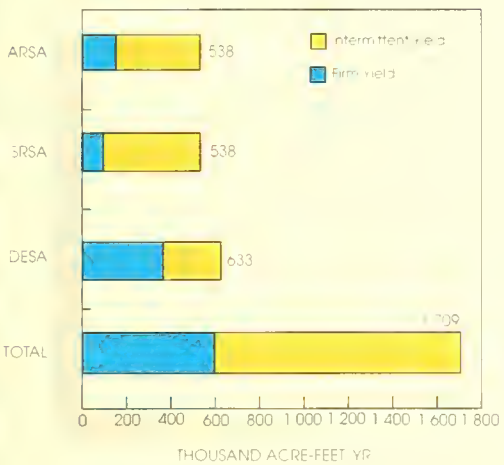


Option 1A, Partial Dependable Supply Contracting, would allocate firm yield to requestors up to the limit of their existing facility

capacities. All other allocations would be intermittent yield.

Reclamation recognizes that this option may result in the allocation of some intermittent yield to agencies that do not have developable groundwater with which to firm up the intermittent surface water supply, and that those agencies would need to develop alternative surface water supplies or join with neighboring agencies in regional groundwater development.

Alternative 1B Allocations

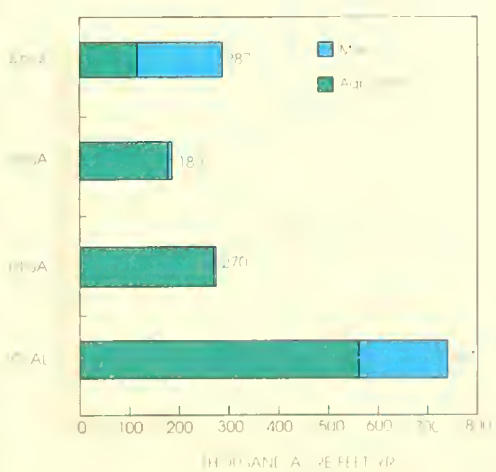


Option 1B, Full Dependable Supply Contracting, would allocate firm yield water only to those requestors without a developable groundwater supply; the ability to develop a groundwater supply would be determined considering physical availability, groundwater quality, and costs. All other area-of-origin requestors, and, to the extent of the available supply, DESA requestors with dual systems already in place, would be offered dependable supply contracts. Refuges would receive Level 4 supplies of intermittent water. As compared to Option 1A, Option 1B would rely more heavily on dependable supply contracting in the area of origin to increase the amount of CVP water available.

Alternative 2:
Agricultural and M&I Needs Within Previously Constructed CVP Units

This alternative was developed to give contracting priority to agricultural and M&I uses (historically, these have been priorities for long-term contracts) and to give contracting priority to entities located within those CVP units already constructed. Firm yield allocations would be limited by the remaining capacity of existing facilities. Water would not be provided to authorized but currently unconstructed units, to other proposed unconstructed projects, or to refuges. A portion of the firm yield and all of the intermittent yield would be allocated to meet future area-of-origin needs.

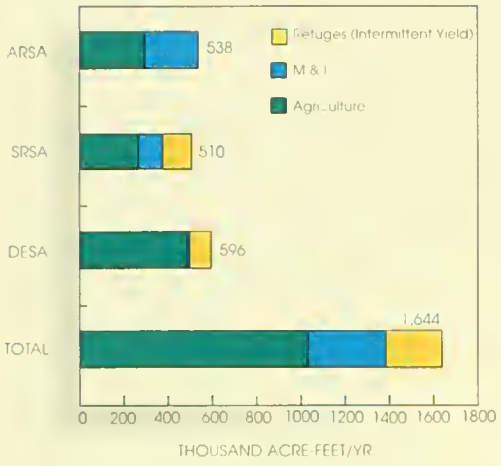
Alternative 2 Allocations



Capacity Limitations that Restrict Allocation

- The Tehama-Colusa Canal can deliver only an additional 144,000 af/yr on an irrigation pattern, although capacity would be available in other than peak crop consumptive use months.
- The American River Division has a remaining yield of about 290,000 af/yr when delivered on an irrigation and M&I pattern.
- The Delta-Mendota Canal can deliver only an additional 270,000 af/yr on a pattern to meet irrigation and M&I needs.

Alternative 3 Allocations



Alternative 3: Agricultural and M&I Needs in Areas of Origin

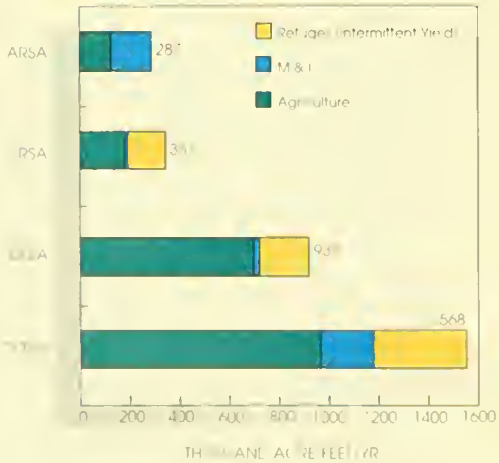
This alternative is similar to Alternative 2 in that it gives contracting priority to agricultural and M&I uses. However, contracting priority is given to those entities located within the CVP areas of origin, in consideration of established state policies. Under this alternative, available intermittent water would be allocated to meet refuge Level 2 needs and to meet water banking needs in the DESA.

Alternative 4: Agricultural and M&I Needs in the Delta Export Service Area

This alternative is also similar to Alternative 2 in that it gives contracting priority to agricultural and M&I uses, but it gives these specifically to entities within the San Joaquin Valley and the San Felipe Unit, where the most CVP water has been requested. Four subalternatives are included within this alternative.

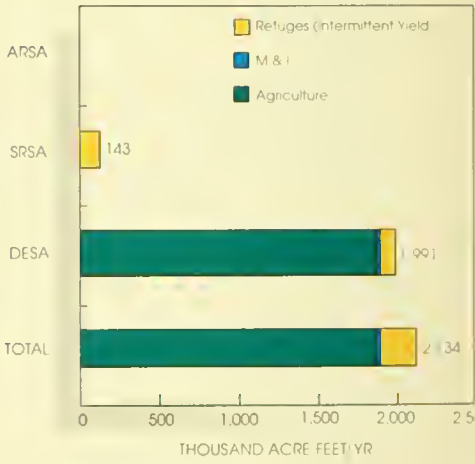
Under 4A and 4B, deliveries within the DESA would be limited to the remaining capacity of the Delta-Mendota Canal, use of the federal portion of San Luis Reservoir, and use of remaining SWP capacity under a COA Section 10h agreement. Under 4C and 4D, deliveries would not be limited to the capacity of existing facilities or flow restrictions in the Delta.

Alternative 4A/B Allocations



Under Alternatives 4A/B, available intermittent water would be allocated to meet Level 4 refuge needs, providing the annual water supply that would facilitate optimal management of all existing lands of each refuge. Under Alternatives 4C/D, intermittent water would be allocated to meet Level 2 refuge needs (supplying the existing annual water levels) and to meet Delta export water banking needs. In dry years, intermittent supply would have to be supplemented from other sources.

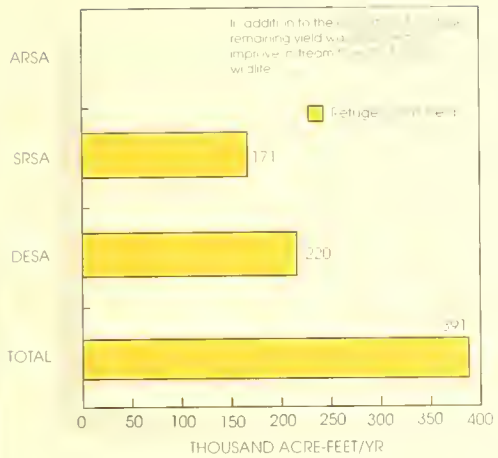
Alternative 4C/D Allocations



Alternative 5: Refuge and Instream Flow Needs

Alternative 5 gives priority to maintenance and enhancement of Central Valley fish and wildlife resources. Refuge needs would be met with firm yield based on Level 4 estimates, and instream flow needs for fish and wildlife would be met with firm yield to the extent possible. Available intermittent water would be allocated to increase Delta outflow.

Alternative 5 Allocations

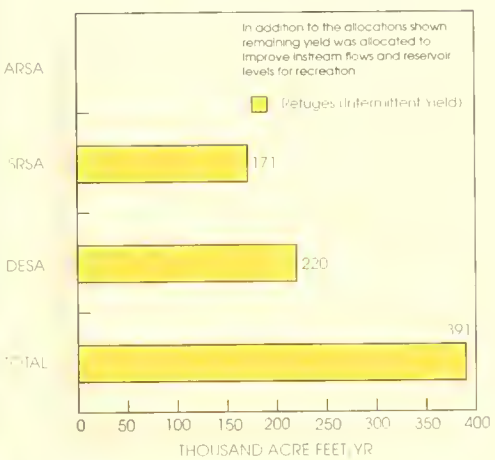


instream flow needs for fisheries and recreation. Remaining firm yield would be allocated to agricultural needs within constructed units. Intermittent water would be allocated to water banking and Mid-Valley Canal needs in the DESA.

Alternative 7: Recreation Needs

Alternative 7 gives preference to selected recreational needs. In response to priorities identified during the scoping process, firm yield allocations would be given first to maintaining water-based recreation in the lower American River, then to maintaining levels in Clair Eagle, Shasta, and Folsom Reservoirs. Intermittent water would be allocated to meet refuge Level 4 needs. ■

Alternative 7 Allocations

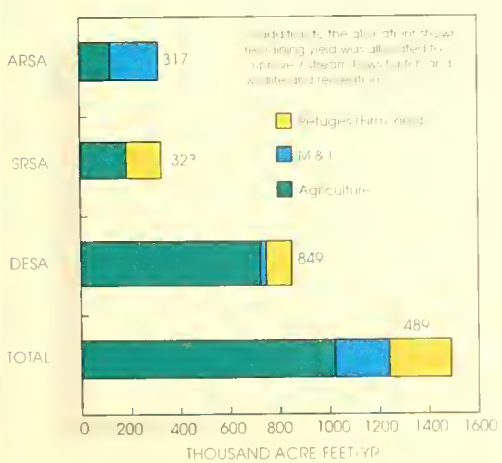


Alternative 6: Refuge and M&I Needs Within Previously Constructed CVP Units, American River Instream Flow Needs, and American River Recreation Needs

Alternative 6 allows analysis of a "hybrid" water contracting policy: allocating water to refuges, M&I, and American River flow needs.

Firm yield would be allocated first to refuge Level 2 needs, next to M&I needs within constructed CVP units, then to American River

Alternative 6 Allocations



Proposed CVP-Wide Allocation

Reclamation has developed tentative proposed allocations of the remaining CVP water yield to the three service areas and to individual agencies within these areas. These tentative allocations may be revised after comments are received on the draft EISs and after completion of the site-specific analyses that must be conducted before contracts are signed. The proposed CVP-wide allocation combines elements of several of the alternatives. It would allocate water to:

- Areas for which major conveyance facilities exist and construction of only minor facilities would be required to make additional deliveries (in some cases, it may also be necessary to enter into agreements for use of conveyance facilities owned by others and to construct local distribution facilities)
- Areas that are presently authorized for service
- Areas of origin, to the extent that capacity for conveyance exists
- Wildlife refuges, in an amount to meet their full needs

PROPOSED CVP-WIDE WATER ALLOCATION
(in af/yr)

Area/Agency	Principal Use	Firm	Conditional[a]	Intermittent	Total
SRSA[b]					
Shasta Dam Area Public Utility District	M&I	4,800	—	—	4,800
Sacramento Valley Canals Agencies[c]					
Colusa County Water District	Ag	—	—	50,000	50,000
Corning Water District	Ag	—	—	7,800	7,800
Dunnigan Water District	Ag	—	—	5,100	5,100
Glenn-Colusa Irrigation District	Ag	—	—	23,800	23,800
Glenn County Lands	Ag	—	—	20,200	20,200
Glide Water District	Ag	—	—	9,700	9,700
Holthouse Water District	Ag	—	—	2,500	2,500
Orland-Artois Water District	Ag	—	—	33,400	33,400
Rancho Saucos Water District	Ag	—	—	3,600	3,600
Tehama Ranch Mutual Water Company	Ag	—	—	1,400	1,400
Yolo-Zamora Water District	Ag	15,000	—	2,800	17,800
Colusa National Wildlife Refuge[d]	Refuge	—	—	25,000	25,000
Delevan National Wildlife Refuge[d]	Refuge	—	—	30,000	30,000
Gray Lodge Wildlife Management Area	Refuge	—	—	36,000	36,000
Sacramento National Wildlife Refuge[d]	Refuge	—	—	50,000	50,000
Sutter National Wildlife Refuge	Refuge	—	—	30,000	30,000
Subtotals, SRSA		19,800		331,300	351,100
ARSA					
Folsom, City of	M&I	20,900	—	—	20,900
Mather Air Force Base	M&I	350	—	—	350
Multi-District Area[c]					
San Juan Suburban Water District	M&I	26,100	—	—	26,100
Citizens Utility Company	M&I	10,800	—	10,800	21,600
Northridge Water District	M&I	6,600	—	6,600	13,200
McClellan Air Force Base	M&I	1,250	—	1,250	2,500
Rio Linda County Water District	M&I	3,400	—	3,400	6,800
Sacramento County Water Agency[c]					
Area 1	Ag	14,500	—	14,500	29,000
Area 3	Ag	23,050	—	23,050	46,100
Omochumnes-Hartnell Water District	Ag	6,000	—	6,000	12,000
Galt Irrigation District	Ag	15,550	—	15,550	31,100
Clay Water District	Ag	1,350	—	1,350	2,700

In addition, water would be allocated in a way that:

- Strongly encourages conjunctive use for agriculture, M&I, and refuges in order to increase the existing water supply and maximize the use of this valuable California resource
- Integrates local groundwater supplies into available CVP supply in order to increase California's total water supply and assist areas with payment capacity limitations

Water allocations would consist of firm, conditional, and intermittent yield. Firm water allocation is firm yield that can be delivered from existing CVP facilities. Conditional allocation consists of firm yield water available to Reclamation but requiring access to the conveyance facilities of others. Intermittent allocation is water available in some years, some of which (north of the Delta) can be conveyed in CVP facilities, and some of which is dependent on capacity in existing non-Reclamation facilities. Interim yield (see page 8) would be used for up to 10 years to make intermittent allocations firm until alternative supplies have been developed. Interim water would be allocated to those intermittent water contractors without existing alternative supplies, based on the contractor's ability to use the water. Preference would be given to contractors located in an overdraft area. Interim water would also be allocated to the state as part of an agreement provided for in Section 10(h) of the COA. The amounts of interim water allocated to the state and others would be reduced over time as intermittent contracts are signed and as firm yield contracts build out.

PROPOSED CVP-WIDE WATER ALLOCATION (continued)
(in af/yr)

Area/Agency	Principal Use	Firm	Conditional[a]	Intermittent	Total
Galt, City of	M&I	9,900	—	—	9,900
Laguna/Elk Grove	M&I	77,700	—	—	77,700
Sunrise East area	M&I	17,200	—	—	17,200
Subtotals, ARSA		234,650	—	82,500	317,150
DESA					
Panoche Water District	Ag	—	23,000	—	23,000
Pleasant Valley Water District	Ag	—	40,000	—	40,000
San Luis Water District	Ag	—	35,000	—	35,000
Westlands Water District	Ag	250,000	100,000	—	350,000
Mid-Valley Water Authority Agencies	Ag	—	—	190,000	190,000
San Felipe Unit	Ag/M&I	19,000	—	—	19,000
City of Dos Palos	M&I	—	1,300	—	1,300
Veterans Administration	M&I	—	850	—	850
Grassland Resource Conservation Dist.	Refuge	—	—	130,000	130,000
Kesterson National Wildlife Refuge	Refuge	6,500	—	—	6,500
Los Banos National Wildlife Refuge	Refuge	18,800	—	—	18,800
Mendota Wildlife Management Area	Refuge	—	—	5,050	5,050
Merced National Wildlife Refuge	Refuge	—	—	4,000	4,000
San Luis National Wildlife Refuge	Refuge	14,700	—	4,300	19,000
Tranquility Gun Club	Refuge	—	—	300	300
Volta Wildlife Management Area	Refuge	—	—	6,000	6,000
Kern National Wildlife Refuge	Refuge	—	—	25,000	25,000
Pixley National Wildlife Refuge	Refuge	—	—	6,000	6,000
Subtotals, DESA		309,000	200,150	370,650[e]	879,800
Totals		**563,450**	**200,150**	**784,450**	**1,548,050**

[a] Firm water subject to available capacity in the California Aqueduct, and dependent upon a permit to pump at Banks.

[b] Based on information available at the time of preparation of the Draft EIS, no allocation was made to the Yolo-Solano agencies in the proposed action. However, more recent information indicates that the agencies, consistent with the criteria set forth, merit preferential consideration for an allocation of 142,400 af/yr of water.

[c] Final mix of firm and intermittent may be adjusted depending on the capability of the groundwater basins.

[d] Requires use of the Red Bluff Diversion Dam during the winter salmon run or an alternative delivery facility and, due to Tehama-Colusa Canal Capacity limitations, can only be delivered during non-peak irrigation months.

[e] Subject to available capacity in the California Aqueduct, and dependent upon a permit to pump at Banks.

EIS Impact Categories

- Soils
- Surface Water Hydrology, Drainage, and Water Quality
- Groundwater Hydrology and Water Quality
- Energy
- Fisheries
- Vegetation and Wildlife
- Recreation
- Aesthetics
- Economics
- Land Use
- Population, Housing, and Secondary Impacts
- Cultural Resources

Approach to Impact Analysis

The water contracting EIS process includes three levels of environmental analysis. First, they focus on a set of CVP-wide water allocation alternatives and analyze regional impacts of water contracting within a particular service area. Second, each EIS includes a cumulative impact analysis that focuses on CVP-wide impacts associated with water contracting in all three service areas. Third, to assist in program decisionmaking, the EISs include general analyses of site-specific impacts associated with individual water contracts.

Impacts of Reclamation's water contracting alternatives were determined by comparing predicted 2020 environmental conditions under Alternatives 1 through 7 with 2020 baseline environmental conditions predicted under the No-Action Alternative. These baseline conditions would differ from existing conditions (based on 1985 data) because they assume full buildout of all existing contracts. For some resource categories, buildout in itself would cause major changes between existing (1985) conditions and no-action 2020 baseline conditions. These changes are not considered impacts of entering into new or expanded CVP contracts under Alternatives 1 through 7. Rather, they are potential impacts of Reclamation's past contracting actions, to which the impacts of new contracting are added.

Impacts were judged to be either "beneficial," "adverse and less than significant," or "adverse and significant." An impact was considered beneficial if environmental conditions would improve compared to no-action 2020 baseline conditions. An impact was considered adverse if environmental conditions would worsen compared to 2020 baseline conditions. The impacts were determined and described with no mitigation, presenting a worst-case analysis.

Proposed Action

The proposed action is a combination of the various alternatives. At this time, the proposed action is tentative and details are expected to change. Therefore, hydrologic modeling has not been performed. Qualitatively, impacts of the proposed action are similar to impacts described for Alternatives 1B and 2 in the SRSA and ARSA and Alternatives 1B and 4A/B in the DESA.

Mitigation Measures

Reclamation has identified potential mitigation measures to avoid or reduce adverse impacts associated with the water contracting alternatives. Mitigation measures to be implemented have not yet been selected, and the public is invited to comment on the potential mitigation measures described in the EISs. Reclamation will propose those regional and cumulative mitigation measures to be implemented at the time of the Final EISs and finally decide on them during preparation of the Record of Decision, once the proposed contracting action has been fully developed. Mitigation for site-specific impacts will be identified in the site-specific NEPA documents.

Impact Areas Presented Below

In the EISs, the impacts of each alternative are analyzed for all of the resource categories that appear in the box at the left. However, the following discussion treats only the resource categories for which the scoping process identified significant issues.

Major Impacts in the Sacramento River Service Area

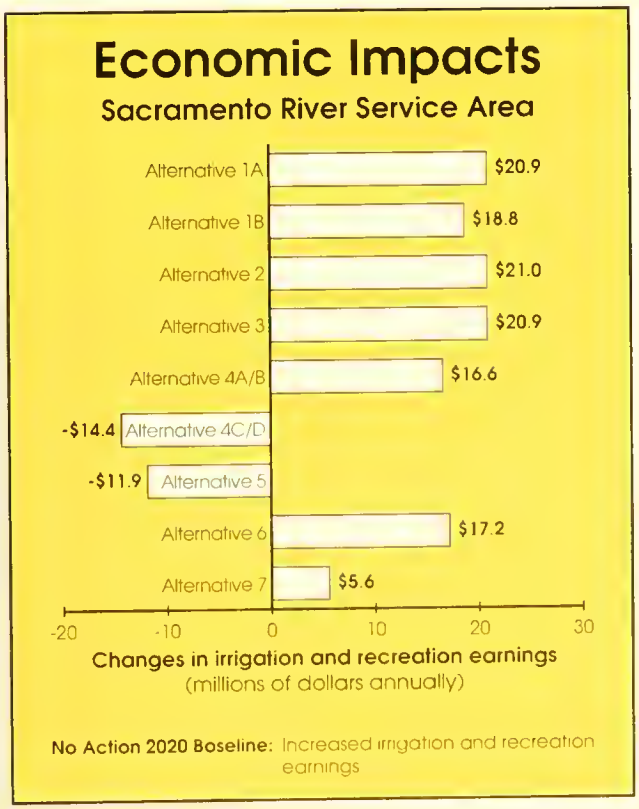
Economics

Regional earnings related to agricultural irrigation and recreation would vary from an increase of $21 million over no action for Alternative 2 (from increased agricultural income) to a decrease of $14 million from no action for Alternatives 4C/D (from losses in recreation-based income due to lower reservoir levels). These changes would be positive for most of the water contracting alternatives, but negative for Alternatives 4C/D and 5, which provide the water to other service areas or fish and wildlife. Regional earnings related to irrigation and recreation for the proposed action would be similar to those for Alternative 2 because reservoir levels would not be lowered substantially and crop production would increase, resulting in a significant economic benefit.

Fisheries

Compared to no-action 2020 baseline conditions, some water contracting alternatives would have significant adverse effects on fisheries in the Sacramento River and Shasta and Clair Engle Reservoirs, but none would adversely affect Trinity River fisheries. Changes in flows or temperatures would cause significant adverse impacts on winter and/or spring chinook salmon runs in the Sacramento River under all water contracting alternatives except Alternatives 2, 4A/B, and 5. Reservoir fisheries would experience significant impacts under Alternatives 4C/D and 6, because reduced reservoir surface area and volume would reduce sunfish spawning success.

Without mitigation, the impacts of the proposed action on SRSA fisheries would be similar to those of Alternative 1B: significant negative impacts on Sacramento River chinook salmon. Increases in Sacramento River summer water temperature would impair rearing conditions for chinook salmon, as well as for steelhead



Alternatives are compared to the no action 2020 baseline

The no action 2020 baseline is compared to current conditions

Fisheries Impacts

Sacramento River Service Area

Alternatives	Sacramento River chinook salmon spawning, rearing, and entrainment	Trinity River chinook salmon	Shasta and Clair Engle Reservoirs
1A	spawning for spring run		
1B	see Note 1		
2			
3	spawning for spring run		
4A/B			
4C/D	spawning for winter and spring run		sunfish spawning success in both reservoirs
5			
6	spawning for winter and spring run		Shasta Reservoir habitat
7	spawning for winter run		
No Action 2020 Baseline	see Note 2	Trinity River fishery not affected	see Note 3

Notes: 1 Spawning for winter and spring runs and rearing for all runs

2 Spawning conditions would be improved slightly for fall and late fall runs but winter and spring runs would be adversely affected. No rearing conditions for all runs would be adversely affected

3 Shasta and Clair Engle Reservoir fisheries not affected

Alternatives are compared to the no action 2020 baseline

The no action 2020 baseline is compared to current conditions.

- Adverse but less than significant
- Adverse and significant
- Beneficial--environmental conditions would improve

trout, and would also impair spawning success of spring- and winter-run chinook. Temperatures are already marginal for summer spawning conditions, and a small temperature increase resulting from lower reservoir levels could cause large declines in chinook salmon egg and larvae survival (lower reservoir levels would result in less cold water available for release).

Vegetation and Wildlife

Provision of CVP water to SRSA wildlife refuges under all alternatives (except Alternative 2 under which no water would be allocated to refuges) would increase refuge wetland acreage by 20,500 acres (Level 2) to 23,000 acres (Level 4). Compared to no-action 2020 baseline conditions, decreases in the Sacramento River winter flow (resulting from the greater reservoir capacity available to store these flows) would have significant adverse impacts on riparian communities under Alternatives 1B and 3. Under Alternative 4C/D, increased spring and summer flows would increase erosion, causing significant negative effects on riparian communities. Also, land conversions by agencies receiving CVP water could cause significant adverse impacts to riparian, wetland, and terrestrial biological communities under all alternatives except 4C/D, 5, and 7. (In Alternative 7, no

Recreation Impacts

Sacramento River Service Area

Alternatives	Storage in Shasta Reservoir (% change)	Storage in Clair Engle Reservoir (% change)	Sacramento River recreation (% change visitor days)	Trinity Reservoir recreation (% change visitor days)	Visitor use days at refuges (% change)
1A	-5	-1	< -10	no change	112
1B	-15	9	< -10	no change	149
2	-4	no change	< -10	no change	no change
3	-5	no change	< -10	no change	112
4A/B	-11	2	< -10	no change	149
4C/D	-14	-9	< -10	no change	112
5	-9	-9	< -10	no change	149
6	-10	no change	increase	no change	112
7	no change	-1	increase	increase	149
No Action 2020 Baseline	little change	higher reservoir elevation	73% increase	55% increase	less visitor days

water would be allocated to SRSA agencies.) Land conversions by these agencies could cause significant adverse impacts to special status species (for example, threatened or endangered species) under all alternatives except Alternative 4C/D.

Without mitigation, the proposed action's impacts on vegetation and wildlife in the SRSA would be similar to those of Alternative 1B. Below the Red Bluff Diversion Dam, Sacramento River winter flow decreases would have significant adverse impacts on riparian communities because lower peak flows and reduced overbank flows would slow reproduction rates, change age classes, and decrease productivity of riparian plant species. Also, land conversions by agencies receiving CVP water would have significant effects on biological communities and special status species.

Recreation

Use of certain types of recreation sites within the SRSA would be variously affected by reservoir level or river flow changes associated with the water contracting alternatives. Compared to no-action 2020 baseline conditions, use of Shasta Reservoir would be significantly reduced under all alternatives except 2, 4A/B, and 7; Alternative 7 would result in increased Shasta Reservoir recreation use. Use of Clair Engle Reservoir would be significantly reduced under Alternatives 1B, 4C/D, and 5, but increased under Alternatives 6 and 7. Sacramento River recreation would experience no significant adverse impacts under all alternative except Alternatives 6 and 7, for which the impacts would be beneficial. Recreational use of refuges would increase under all alternatives except Alternative 2, in which refuges are not provided CVP water.

Without mitigation, impacts of the proposed action on recreation would be similar to those of Alternative 1B. Shasta Reservoir recreation would be significantly reduced due to lower reservoir levels, but refuge recreation would increase by 149 percent.

Vegetation and Wildlife Impacts

Sacramento River Service Area

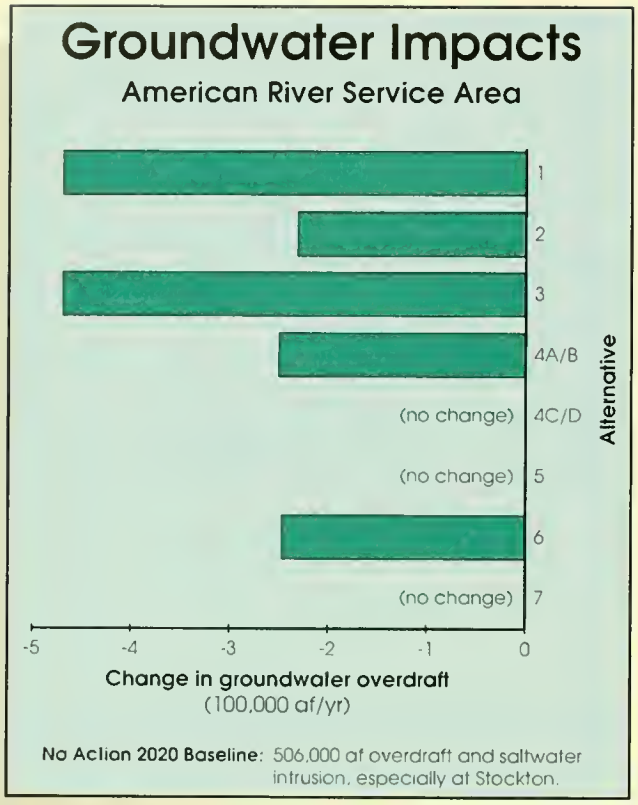
Alternatives	Sacramento River riparian communities	Tributary riparian communities	Wetland community	Special status species	Terrestrial communities	Additional site-specific impacts to refuge wetlands
1A						
1B						
2						no change
3						
4A/B						
4C/D	below Red Bluff Dam	no change	no change	no change	no change	
5		no change	no change		no change	
6						
7		no chonge	no change		no chonge	
No Action 2020 Boseline	see Note	79 miles affected	1,600 acres affected	47 species	39,000 ocres affected	19,000 acres affected

Note: Reduced area changes in composition and structure

Alternatives are compared to the no action 2020 baseline.

The no action 2020 baseline is compared to current conditions

- Adverse but less than significant
- Adverse and significant
- Beneficial--environmental conditions would improve



Impacts in the American River Service Area

Groundwater

Alternatives that supply CVP water to ARSA agencies (Alternatives 1A/B, 2, 3, 4A/B, and 6) would reduce the projected 2020 groundwater overdraft conditions predicted under the No-Action Alternative by approximately 500,000 af/yr. These reductions would range from 230,000 af/yr to 470,000 af/yr, depending on the amount of CVP water supplied. Under the proposed action, the decrease in overdraft of about 230,000 af/yr would result in benefits to both groundwater levels and quality.

Economics

Under all alternatives, regional earnings related to agricultural irrigation and recreation would decrease as compared to no-action 2020 baseline conditions. These changes in regional earnings would range from $1.5 million under Alternative 4A/B, which would affect mainly farm income, to $7 million under Alternative 1B, which would affect recreational income more than any other alternative. These figures do not include benefits of providing CVP water for municipal and industrial use. Regional earnings under the proposed action would also decrease (similarly to Alternative 2), but the $1.5 million decrease from the no-action level is the lowest for any alternative considered. This decrease was predicted by computer modeling, which indicates lower prices would result from additional production in the SRSA and DESA. The model did not consider changes in cropping that would result under such conditions.

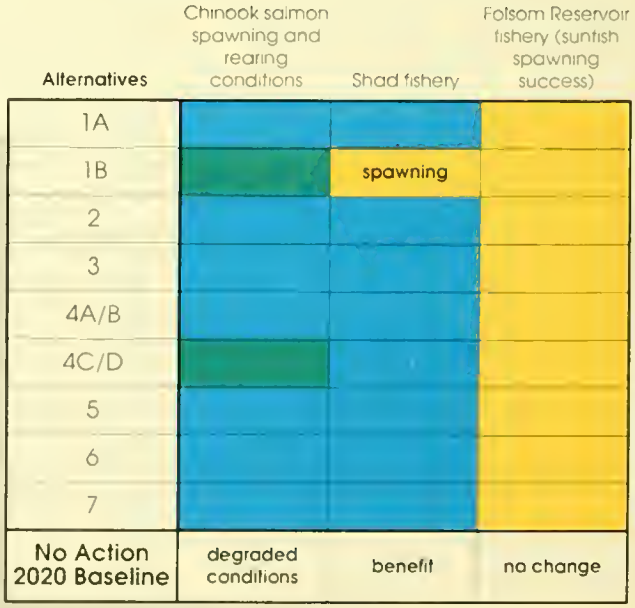
Fisheries

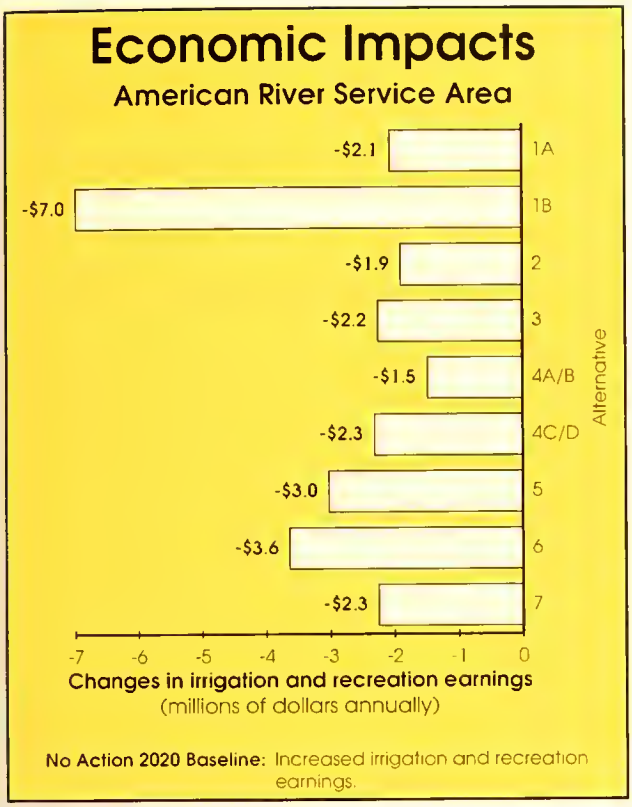
Under the No-Action Alternative, buildout of existing CVP contracts would substantially reduce American River flows, degrading spawning and rearing

Alternatives are compared to the no action 2020 baseline

The no action 2020 baseline is compared to current conditions.

- Adverse but less than significant
- Adverse and significant
- Beneficial--environmental conditions would improve



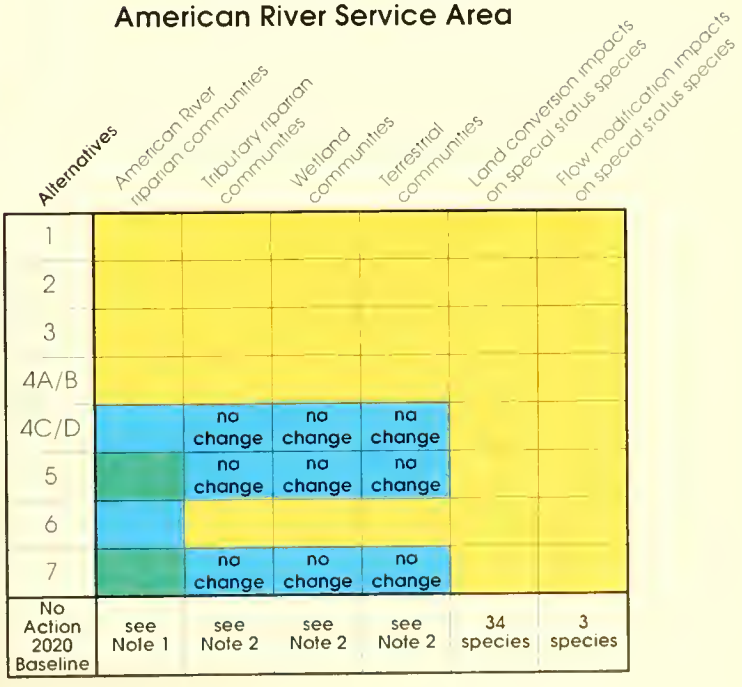


Alternatives are compared to the no action 2020 baseline.

The no action 2020 baseline is compared to current conditions

- Adverse but less than significant
- Adverse and significant
- Beneficial--environmental conditions would improve

conditions for chinook salmon. Compared to these no-action 2020 baseline conditions, the proposed action and other water contracting alternatives would not have further significant adverse effects on American River chinook salmon spawning and rearing conditions. The proposed action, Alternatives 1B, 3, and 4C/D would, in fact, result in better conditions than no action because additional releases would be made to meet new water contracts. The American River American shad fishery would experience significant adverse impacts only under Alternative 1B because of reduced flows during spawning season. The Folsom Reservoir sunfish fishery would experience significant adverse impacts under the proposed action and all other alternatives because the reservoir level would be lower.



Notes: Reduction and changes in composition and structure

Major reduction

Recreation Impacts

American River Service Area

Alternatives	Lower American River recreation use (change in no. of months between Apr & Oct of avg flows < 1,500 cfs & < 1,200 cfs)	Folsom Reservoir recreation (% change in visitor-days)
1A	4 at 1,500 cfs	-5
1B	3 at 1,500 cfs 3 at 1,200 cfs	-21
2	3 at 1,500 cfs	-4
3	3 at 1,500 cfs	-5
4A/B	3 at 1,500 cfs	-3
4C/D	-1 at 1,500 cfs	-8
5	0 at 1,500 cfs	-10
6	1 at 1,500 cfs	-10
7	-2 at 1,500 cfs 1 at 1,200 cfs	-8
No Action 2020 Baseline	3 of 7 high-use months with flow less than 1,500 csf.	79% increase in visitor-days

Alternatives are compared to the no action 2020 baseline.

The no action 2020 boseline is compared to current conditions.

Adverse but less than significant

Adverse and significant

Beneficial--environmental conditions would improve

Vegetation and Wildlife

Reduced winter, spring, and summer flows in the American River would have significant adverse impacts on riparian communities under Alternatives 1A, 1B, 2, 3, and 4A/B. Increased flows would benefit these riparian communities under Alternatives 5 and 7. Also, land conversions by agencies receiving CVP water could cause significant adverse impacts to riparian, wetland, and terrestrial biological communities and endangered and threatened (special status) species under all alternatives except 4C/D, 5, and 7.

Without mitigation, the proposed action's impacts on vegetation and wildlife in the ARSA would be similar to those of Alternative 2. Reduced American River winter, spring, and summer flows would increase plant stress, slow reproduction rates, change age classes, and decrease productivity of riparian plant species. Also, land conversions by agencies receiving CVP water would have significant effects on biological communities and special status species.

Recreation

Compared to no-action 2020 baseline conditions, use of the lower American River would be significantly reduced under Alternatives 1A/B, 2, 3, and 4A/B. Folsom Reservoir recreation would experience significant adverse impacts under Alternatives 1B, 5, and 6 because lower reservoir levels would cause anticipated visitor days to decrease by more than 10 percent without mitigation. Recreation impacts of the proposed action in the ARSA would be similar to those of Alternative 2. Significant reduction in American River recreation is predicted because flows would drop below 1,500 cfs for an additional three months between April and October. Adverse impacts on Folsom Reservoir recreation would, however, be less than significant.

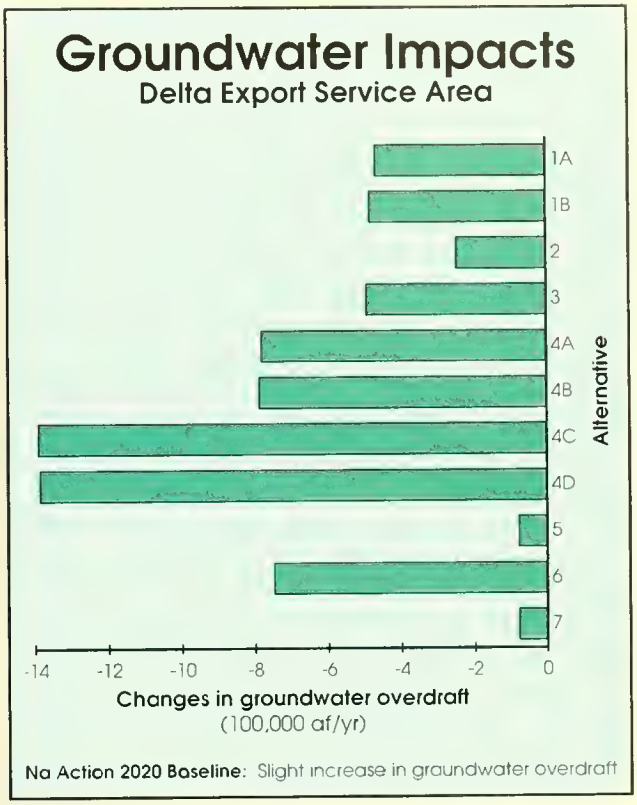
Impacts in the Delta Export Service Area

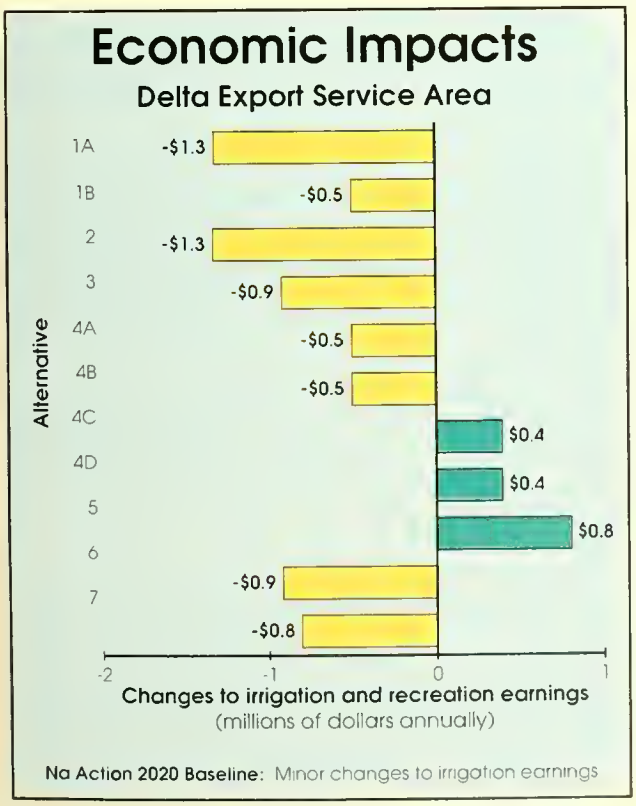
Groundwater

Alternatives that supply CVP water to DESA agencies (all alternatives except 5 and 7) would reduce the projected 2020 groundwater overdraft conditions predicted under the No-Action Alternative. These reductions in groundwater overdraft would range from 77,000 af/yr to 1.4 million af/yr, depending on the amount of CVP water supplied. Under the proposed action, the decrease in overdraft of about 600,000 af/yr would have a beneficial impact on groundwater levels. However, dissolved solids in surface water would degrade groundwater quality further.

Economics

Water contracting alternatives would cause changes in regional earnings related to agriculture and recreation as compared to no-action 2020 baseline conditions. These changes in regional earnings would range from an increase of $400,000 in recreation-related income at the refuges under Alternative 4C/D to a decrease of $1.3 million in farm-related income under Alternatives 1A and 2, which restrict DESA deliveries to





Alternatives are compared to the no action 2020 baseline

The no action 2020 baseline is compared to current conditions

Adverse and significant

Beneficial--environmental conditions would improve

the capacity of existing facilities. Changes in regional earnings would be negative for all water contracting alternatives except Alternatives 4C/D and 5. Regional earnings under the proposed action would also be negative (as for Alternative 4A/B). The decrease shown for the proposed action from the No-Action Alternative level was predicted by the economics computer model, which did not consider changes in cropping patterns. Crop changes would result in increased regional earnings under the proposed action.

Drainage

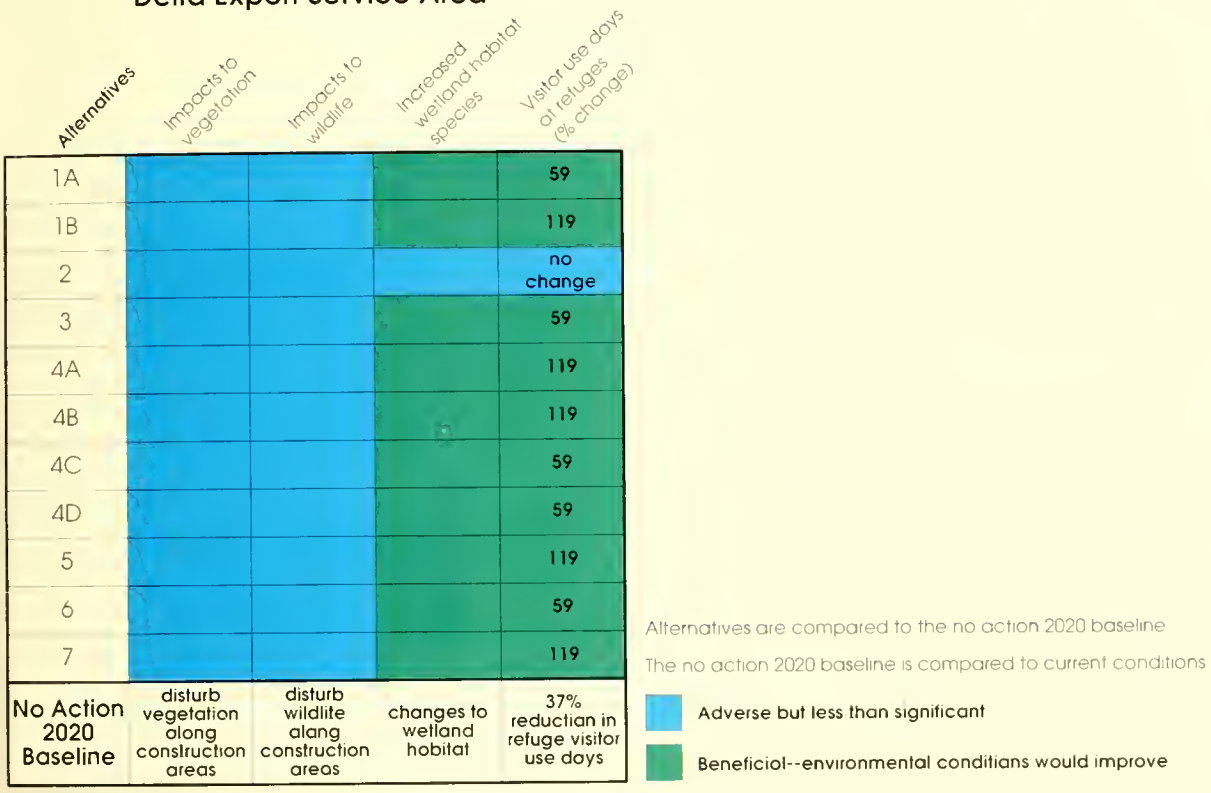
Compared to no-action 2020 baseline conditions, all water contracting alternatives would either improve or not significantly impact DESA drainage conditions. If CVP water is not delivered, the areas with drainage problems would continue to use groundwater. Therefore, these drainage problems would occur with or without added CVP water.

Vegetation, Wildlife, and Recreation

Provision of CVP water to DESA wildlife refuges under all alternatives except Alternative 2 would increase projected 2020 wetland acreage between 10,000 acres (Level 2) and 22,000 acres (Level 4) and would increase rec-

Vegetation, Wildlife and Recreation Impacts

Delta Export Service Area



reation use of refuges. The proposed action would increase refuge wetlands acreage by 22,000 acres. The water contracting alternatives are expected to have beneficial effects on DESA vegetation and wildlife.

Summary of Cumulative Impacts

Economics

Water contracting alternatives would cause changes not only in irrigation and recreation benefits, as reviewed above for each service area, but also in M&I and power benefits. The CVP-wide sum of these benefits ranges from an increase of approximately $55 million under Alternative 3, from agricultural growth mainly in the SRSA to a decrease of $51 million under Alternative 4C due to recreation and power losses in the SRSA and ARSA. The change in these benefits from the No-Action Alternative level would be positive for all alternatives except Alternatives 4C/D and 5. A positive benefit similar in magnitude to the $40 million resulting from Alternative 1A would result from the proposed action.

Delta Water Quality

The proposed action and all other water contracting alternatives would meet the existing Delta salinity water quality stan-

Fisheries Impacts

Cumulative

Alternative	Striped bass	Other species	Special status species
1A	Delta	Delta	Delta
1B	Delta	Delta	Sacramento R. Delta
2	Delta	Delta	Delta
3	Delta	Delta	Delta
4A/B	Delta	Delta	Delta
4C/D	not applicable		Sacramento R.
5	Delta	Delta	Sacramento R.
6	Delta	Delta	Sacramento R. Delta
7			Sacramento R.

Alternatives are compared to the no action 2020 baseline

- Adverse but less than significant
- Adverse and significant
- Beneficial--environmental conditions would improve

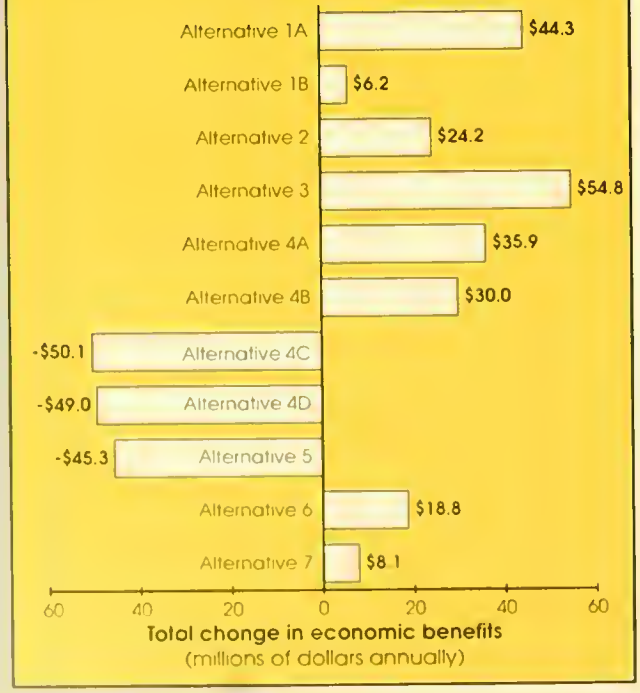
dards established by the California State Water Resources Control Board.

Delta Fisheries

Without mitigation, all water contracting alternatives except Alternatives 5 and 7 would have significant adverse impacts for effects on striped bass and other Delta fish species because of increased diversion and export from the Delta or reduced Delta outflow.

Economic Impacts

Cumulative



Unresolved Issues

Two types of further studies will be necessary to fully resolve certain issues identified in the EISs. First, additional planning studies are needed to determine the best methods to implement conjunctive use programs called for under the proposed action. Second, additional site-specific environmental assessments will be conducted.

The Final EISs will further address several other issues not fully resolved in the Draft EIS:

- Reclamation will rerun its computer models to incorporate improvements and to address an error that resulted in a firm yield of up to 300,000 af/yr less than that used in the Draft EIS analyses. Where changes in allocations under alternatives are necessary, DESA allocations will be reduced.
- Reclamation will analyze with greater specificity the proposed action's impacts based on additional runs of the computer models.
- Reclamation will describe the potential effects of the SWRCB's Draft Sacramento-San Joaquin Delta Water Quality Control Plan, released in November 1988, on the CVP water contracting program.
- Mitigation measures to be implemented will be selected. Procedures for mitigation of site-specific impacts, in particular those on special status species, wetlands, and cultural resources, will be identified.

Glossary

Acre-Foot. The quantity of water (43,560 cubic feet or 326,700 gallons) that would cover 1 acre to a depth of 1 foot.

Area of Origin. The area in which a water supply originates. The term is based on three statutes in the California State Water Code: the County of Origin and the Watershed Protection Statutes and the Delta Protection Act.

Buildout. Delivery of full allocation of CVP water under existing contracts.

Conjunctive Use. Operation of a groundwater basin in coordination with a surface water system.

Firm Yield. See page 8.

Groundwater Overdraft. Pumping groundwater for use at a rate greater than the rate of recharge.

Interim Water. See page 8.

Intermittent Yield. See page 8.

Level 2 Refuge Water Supply. An amount of water for wildlife refuges equal to the existing average annual supply.

Level 4 Refuge Water Supply. An annual supply that would facilitate optimal management of all existing refuge lands.

M&I. Municipal and Industrial.

Payment Capacity. A measure of the ability to pay for water based on productivity of the land.

NEPA. National Environmental Policy Act. Section 102(C) of NEPA requires preparation of an environmental impact statement for any federal action that has a significant effect on the human environment.

Safe Yield. The rate at which water can be removed from an aquifer without exceeding recharge and incurring overdraft.

Visitor Day. A standard unit of use consisting of a visit by one individual to a recreation development or area for recreation purposes during any reasonable portion or all of a 24-hour period.

Yield. The volume of water available over a period of time from a storage facility.

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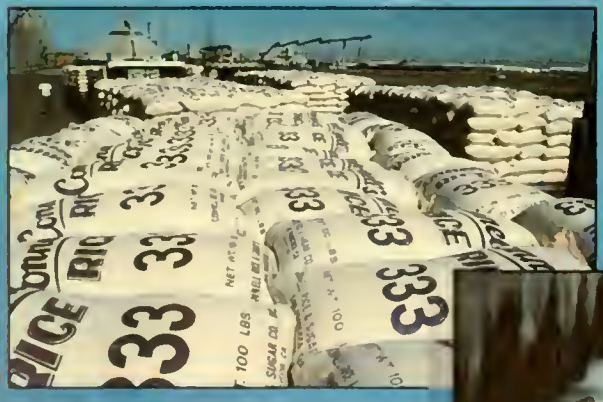

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